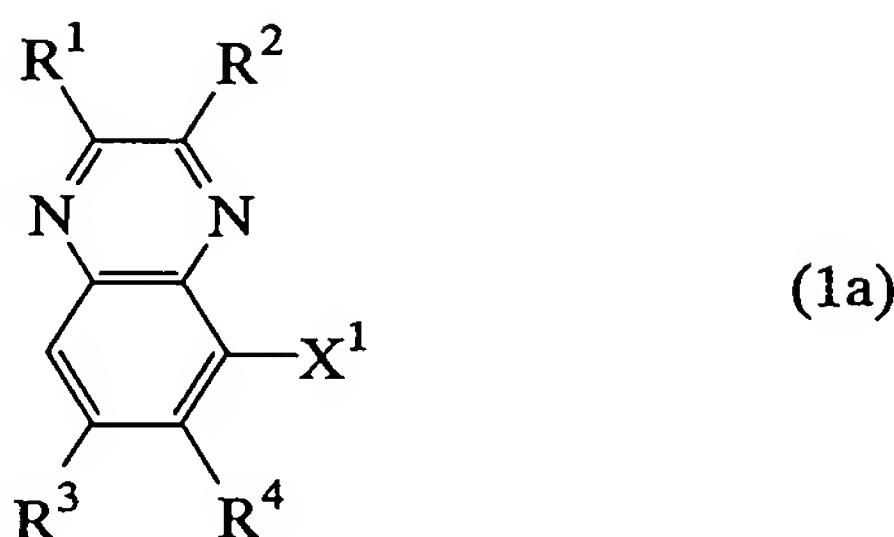


CLAIMS:

1. An aminoquinoxaline compound of the following formula (1a)
[Chemical Formula 1]



5

wherein R¹ and R² independently represent a hydrogen atom, a hydroxyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may

10 be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided
15 that when R¹ and R² are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

20 R³ and R⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R³ and R⁴ are, respectively, the above-defined phenyl, pyridyl,
25 biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

30 R³ and R⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R³ and R⁴ are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

heteroaryl group, these groups may be joined through a single bond;

X¹ represents -NH-R⁵-NH₂ or -NH-R⁶;

R⁵ represents a C₁-C₁₀ alkylene group, a -C(O)CH₂-,
5 -CH₂C(O)-, a divalent benzene ring which may be substituted
with Y, a divalent pyridine ring which may be substituted
with Y, a divalent biphenyl group which may be substituted
with Y, a divalent naphthalene ring which may be substituted
with Y, a divalent thiophene ring which may be substituted
10 with Y, a pyrrole ring which may be substituted with Y, a
furan ring which may be substituted with Y, or a condensed
hetero ring which may be substituted with Y;

R⁶ represents a hydrogen atom, a C₁-C₁₀ alkyl group, an
acetyl group, a phenyl group which may be substituted with Y,
15 a pyridyl group which may be substituted with Y, a biphenyl
group which may be substituted with Y, a naphthyl group which
may be substituted with Y, a thienyl group which may be
substituted with Y, a pyrolyl group which may be substituted
with Y, a furyl group which may be substituted with Y or a
20 condensed heteroaryl group which may be substituted with Y;

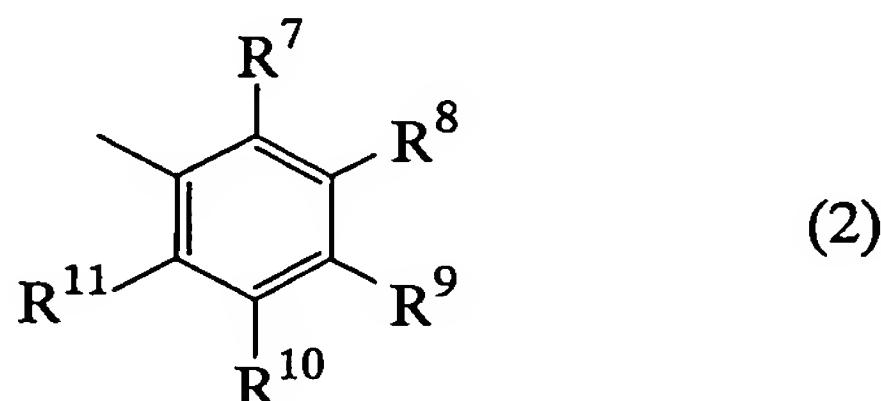
Y represents a halogen atom, a cyano group, a nitro
group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀
alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a
C₁-C₁₀ cyanoalkyl group, a phenyl group which may be
25 substituted with Z, a pyridyl group which may be substituted
with Z, a biphenyl group which may be substituted with Z, a
naphthyl group which may be substituted with Z, a thienyl
group which may be substituted with Z, a pyrolyl group which
may be substituted with Z, a furyl group which may be
30 substituted with Z or a condensed heteroaryl group which may
be substituted with Z provided that if Y is two or more in
number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro
group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀
35 alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a
C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a
naphthyl group, a thienyl group, a pyrolyl group, a furyl

group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.

2. The aminoquinoxaline compound according to claim 1,
5 wherein R¹ and R² in the above formula (1) independently represent a group of the following formula (2)

[Chemical Formula 2]

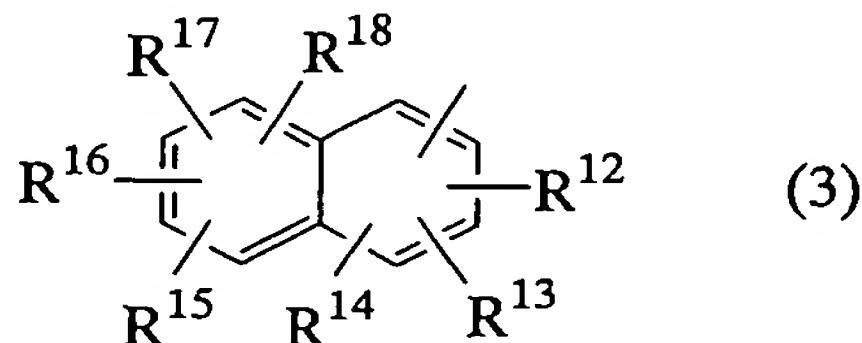


wherein R⁷-R¹¹ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₄ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₄ cyanoalkyl group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group.

3. The aminoquinoxaline compound according to claim 1,
25 wherein R¹ and R² in the above formula (1) independently represent a group of the following formula (3)

[Chemical Formula 3]

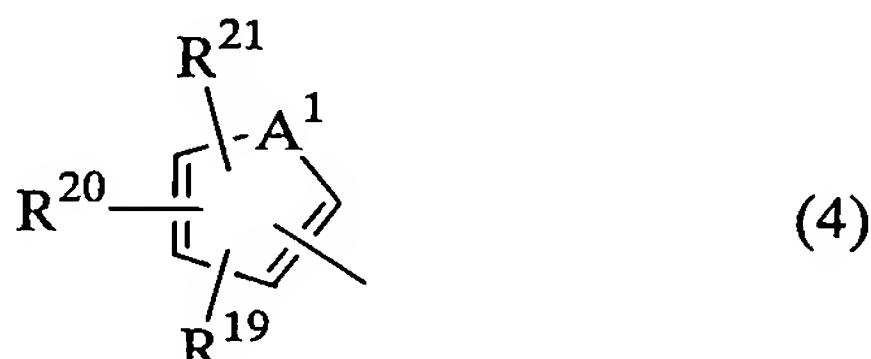


wherein R¹²-R¹⁸ independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a 5 C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a 10 C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

15 4. The aminoquinoxaline compound according to claim 1, wherein R¹ and R² in the above formula (1) independently represent a group of the following formula (4)

[Chemical Formula 4]



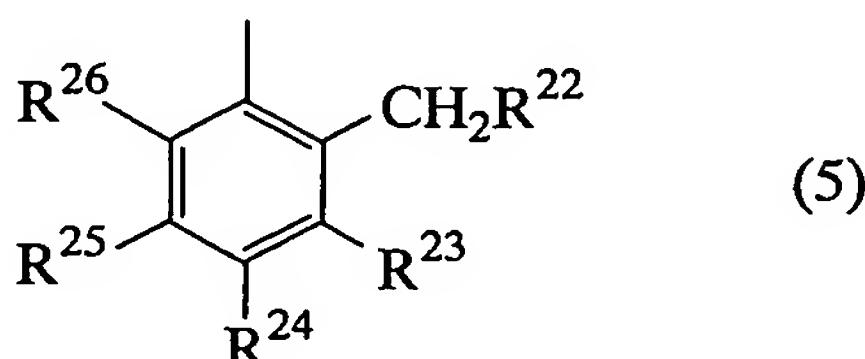
20 wherein R¹⁹-R²¹ independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a 25 C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a 30 C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

A¹ represents NH, O or S.

5. The aminoquinoxaline compound according to claim 1, wherein R¹ and R² in the above formula (1) represent a group of the following formula (5)

[Chemical Formula 5]



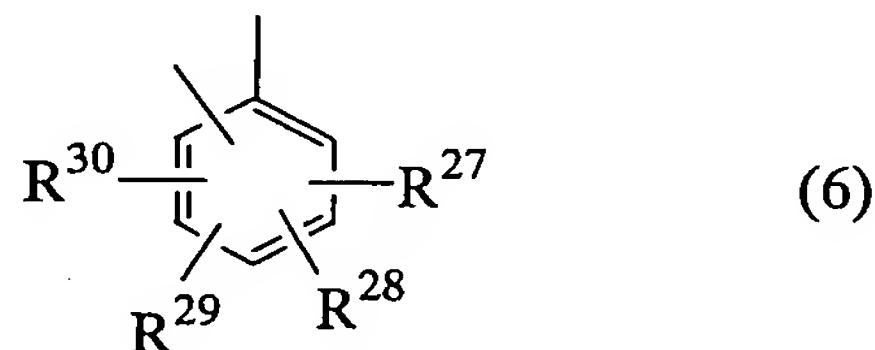
5

wherein R²² represents a halogen atom or a cyano group, R²³-R²⁶ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thiaryl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thiaryl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20 6. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁵ in the formula (1) represents a group of the following formula (6)

[Chemical Formula 6]



25 wherein R²⁷-R³⁰ independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a

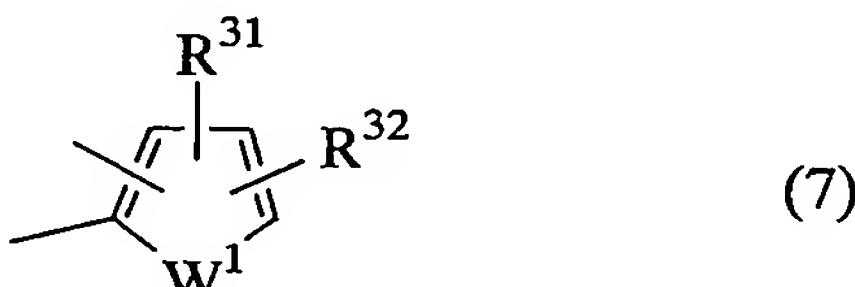
C_1-C_{10} alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C_1-C_{10} alkyl group, a C_1-C_{10} haloalkyl group, a C_1-C_{10} alkoxy group, a C_1-C_{10} cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group.

10

7. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R^5 in the formula (1) represents a group of the following formula (7)

[Chemical Formula 7]



15

wherein R^{31} - R^{32} independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C_1-C_{10} alkyl group, a C_1-C_{10} alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

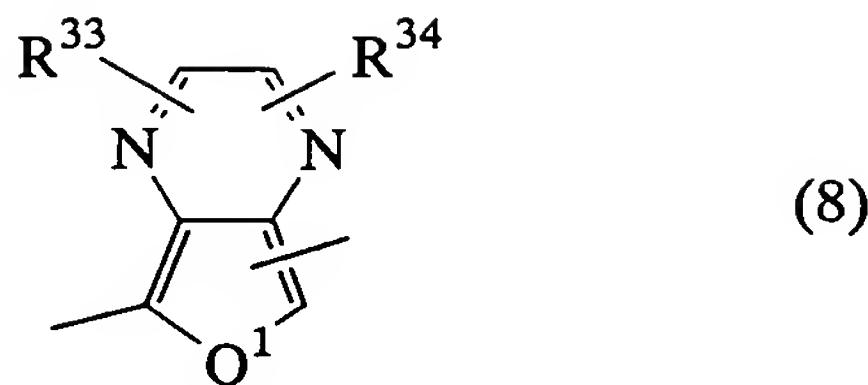
Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C_1-C_{10} alkyl group, a C_1-C_{10} haloalkyl group, a C_1-C_{10} alkoxy group, a C_1-C_{10} cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group; and

W^1 represents NH, O or S.

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8. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R^5 in the formula (1) represents a group of the following formula (8)

[Chemical Formula 8]



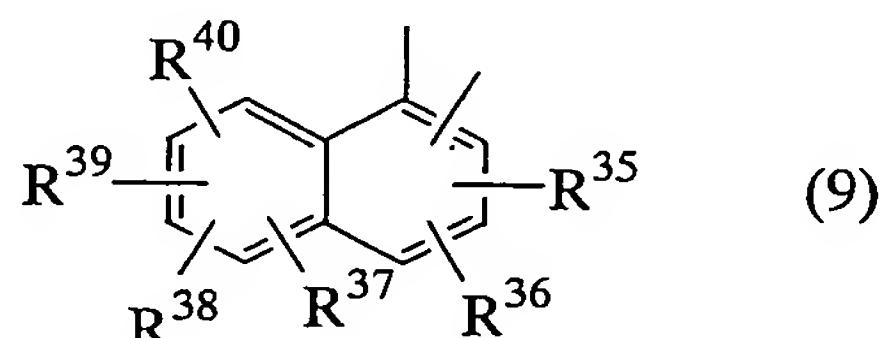
wherein R³³-R³⁴ independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

Q¹ represents NH, O or S.

9. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁵ in the formula (1) represents a group of the following formula (9)

[Chemical Formula 9]

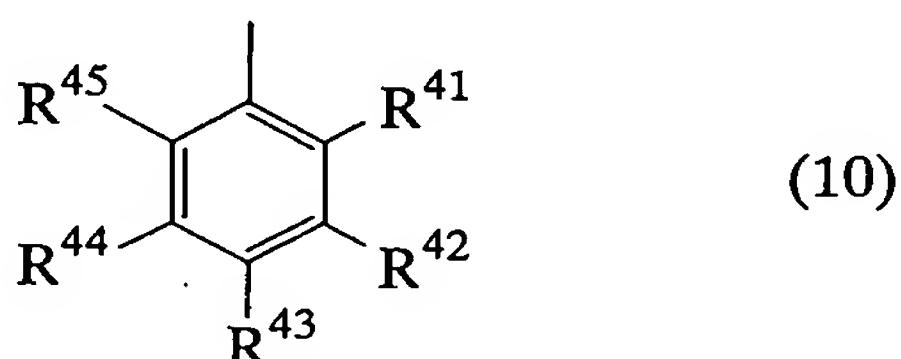


wherein R³⁵-R⁴⁰ independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

10. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁶ in the formula (1) represents a group of the following formula (10)

[Chemical Formula 10]



(10)

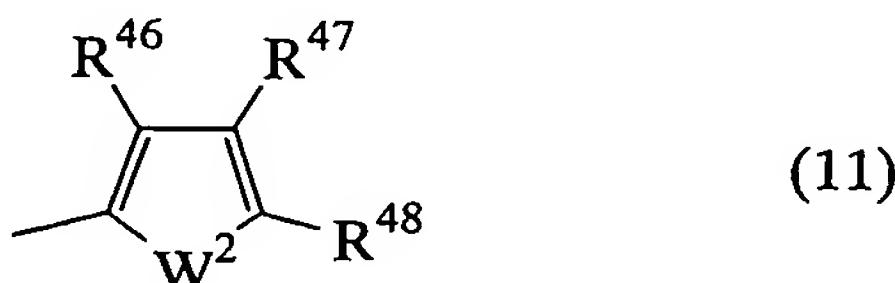
wherein R⁴¹-R⁴⁵ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

25

11. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁶ in the formula (1) represents a group of the following formula (11)

[Chemical Formula 11]



(11)

30

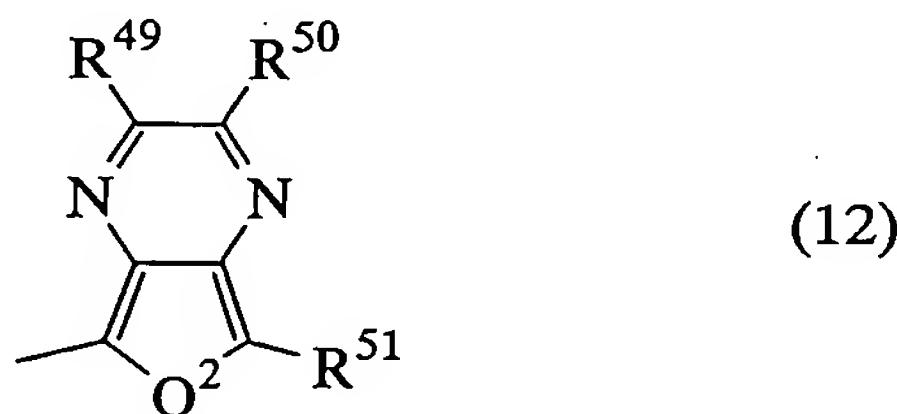
wherein R⁴⁶-R⁴⁸ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, 5 a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a 10 C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

W² represents NH, O or S.

15 12. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁶ in the formula (1) represents a group of the following formula (12)

[Chemical Formula 12]



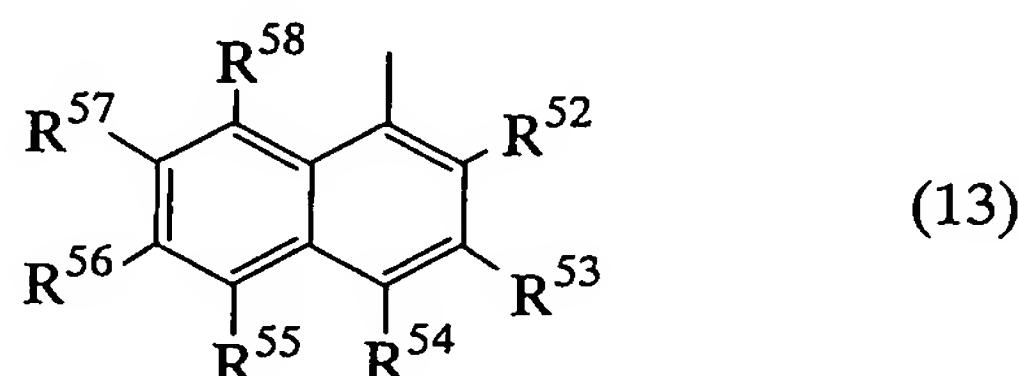
20 wherein R⁴⁹-R⁵¹ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl 25 group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a 30 naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

Q² represents NH, O or S.

13. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R⁶ in the formula (1) represents a group of the following formula (13)

[Chemical Formula 13]



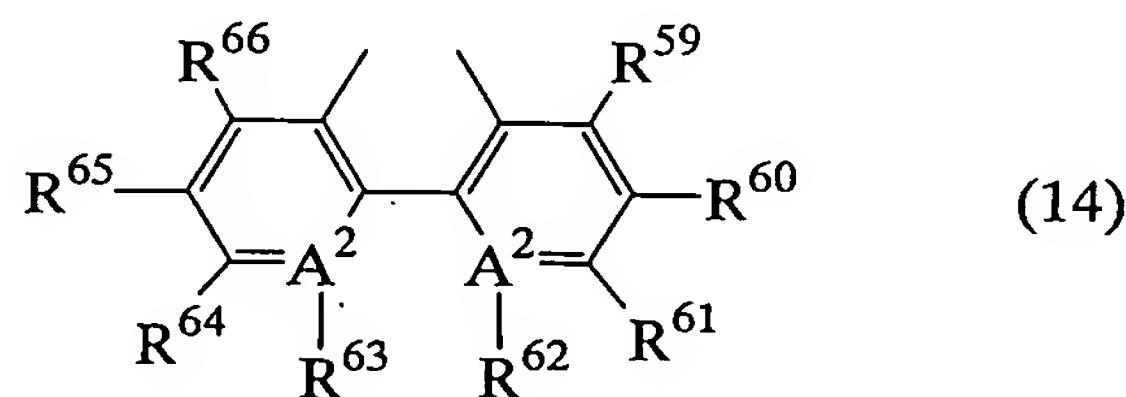
5

wherein R⁵²-R⁵⁸ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thiienyl group which may be substituted with Z; and

10 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thiienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20 14. The aminoquinoxaline compound according to claim 1, wherein the group formed by bonding R¹ and R² through a single bond in the formula (1) is represented by the formula (14)

[Chemical Formula 14]



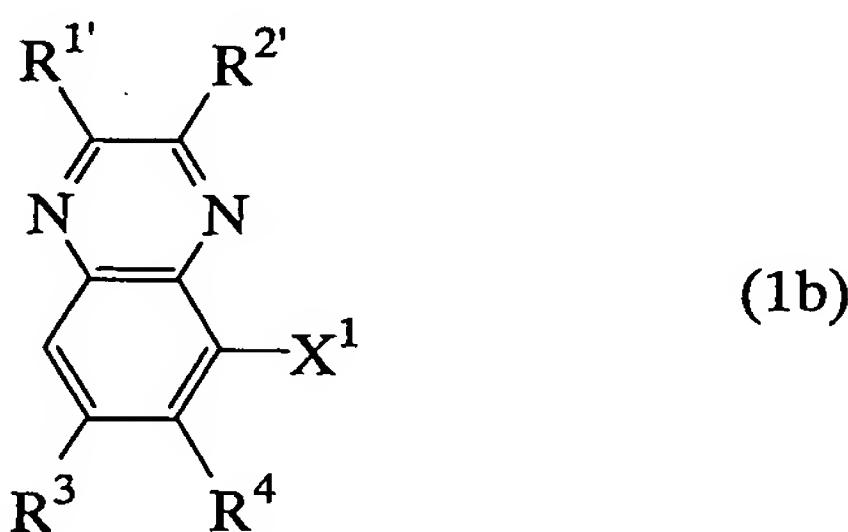
25 wherein A₂ are each CN or N, R⁵⁹-R⁶⁶ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be

substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when A² represents N, R⁶² and R⁶³ are both non-existent.

15. An aminoquinoxaline compound of the following formula (1b),

[Chemical Formula 15]



15

wherein R^{1'} and R^{2'} join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl

group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

R³ and R⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R³ and R⁴ are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

X¹ represents -NH-R⁵-NH₂ or -NH-R⁶;

R⁵ represents a C₁-C₁₀ alkylene group, -C(O)CH₂- , -CH₂C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

R⁶ represents a hydrogen atom, a C₁-C₁₀ alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

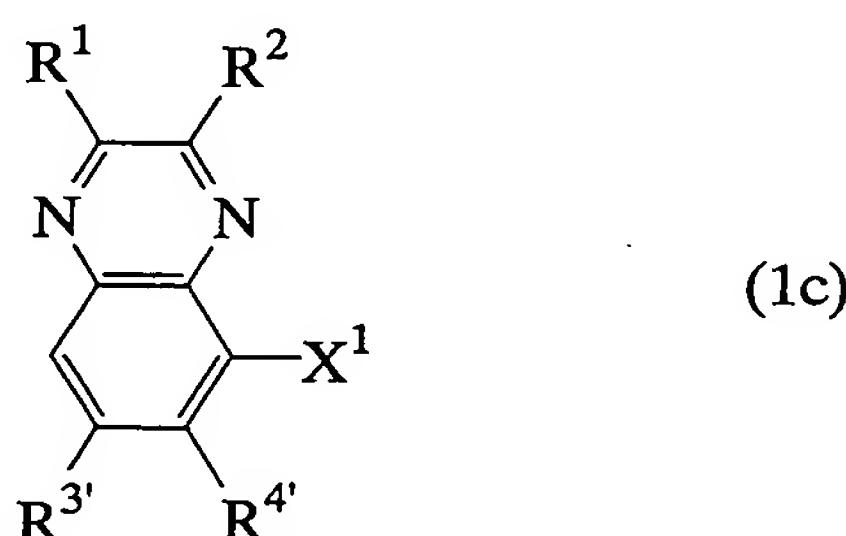
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

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16. An aminoquinoxaline compound of the following formula (1c),

[Chemical Formula 16]



25 wherein R¹ and R² independently represent a hydrogen atom, a hydroxyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a

30

furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R¹ and R² are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R^{3'} and R^{4'} join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

X¹ represents -NH-R⁵-NH₂ or -NH-R⁶;

R⁵ represents a C₁-C₁₀ alkylene group, -C(O)CH₂- ,

-CH₂C(O)- , a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

R⁶ represents a hydrogen atom, a C₁-C₁₀ alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

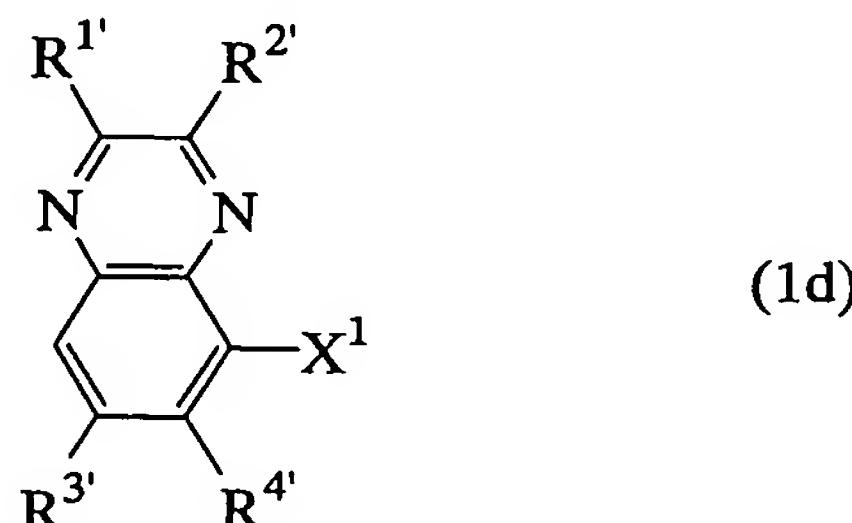
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

17. An aminoquinoxaline compound of the following formula

(1d),

[Chemical Formula 17]



wherein R¹ and R² join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , 5 -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , 10 -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted 15 with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z, and R³ and R⁴ join together to form 20 -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , 25 -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , 30 -CH=CHCH₂O- , -N=CHCH=CH- , -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted 35 with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl

group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z;

5 X¹ represents -NH-R⁵-NH₂ or -NH-R⁶;

R⁵ represents a C₁-C₁₀ alkylene group, -C(O)CH₂- , -CH₂C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

15 R⁶ represents a hydrogen atom, a C₁-C₁₀ alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

20 Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

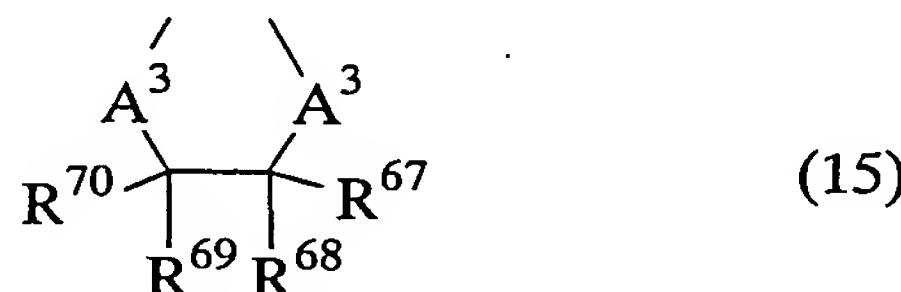
35 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a

C_1 - C_{10} cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

5

18. The aminoquinoxaline compound according to claim 15 or 17, wherein the group formed by joining $R^{1'}$ and $R^{2'}$ together is of the following formula (15)

[Chemical Formula 18]



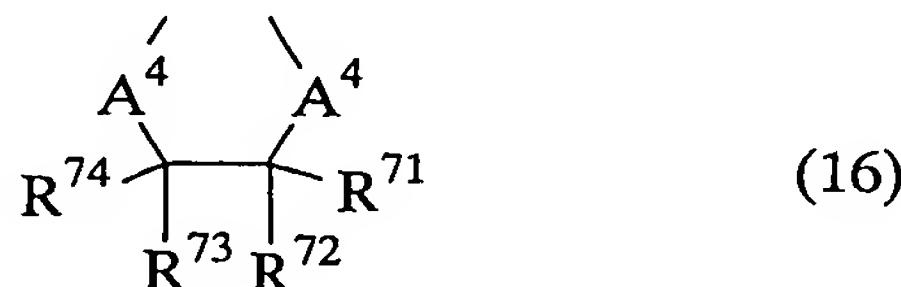
10

wherein A^3 represents O or S, and R^{67} - R^{70} independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C_1 - C_{10} alkyl group, a C_1 - C_{10} alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C_1 - C_{10} alkyl group, a C_1 - C_{10} haloalkyl group, a C_1 - C_{10} alkoxy group, a C_1 - C_{10} cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group.

25 19. The aminoquinoxaline compound according to claim 16 or 17, wherein the group formed by joining $R^{3'}$ and $R^{4'}$ together is of the following formula (16)

[Chemical Formula 19]

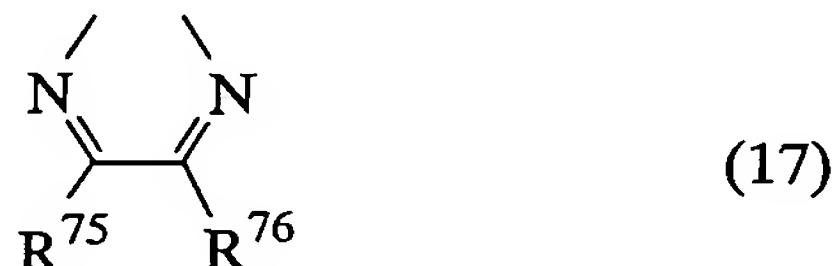


wherein A⁴ represents O or S, and R⁷¹-R⁷⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which 5 may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group.

15 20. The aminoquinoxaline compound according to claim 16 or 17, wherein the group formed by joining R^{3'} and R^{4'} together is of the following formula (17)

[Chemical Formula 20]

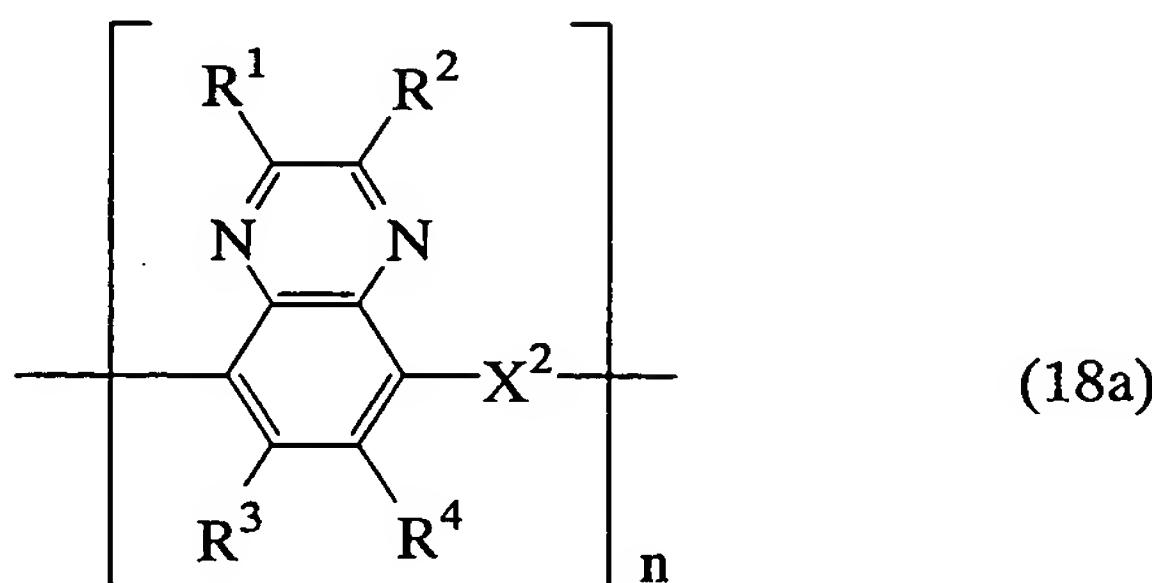


20 wherein R⁷⁵ and R⁷⁶ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl 25 group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl 30 group or a condensed heteroaryl group.

21. A polyaminoquinoxaline compound having recurring units of the following formula (18a) obtained by polymerizing the monomer defined in claim 1,

[Chemical Formula 21]



5

wherein R¹ and R² independently represent a hydrogen atom, a hydroxyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R¹ and R² are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R³ and R⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R³ and R⁴ are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed

heteroaryl group, these groups may be joined through a single bond;

X² represents -NH-R⁷⁷-NH- or -NH-R⁷⁸-;

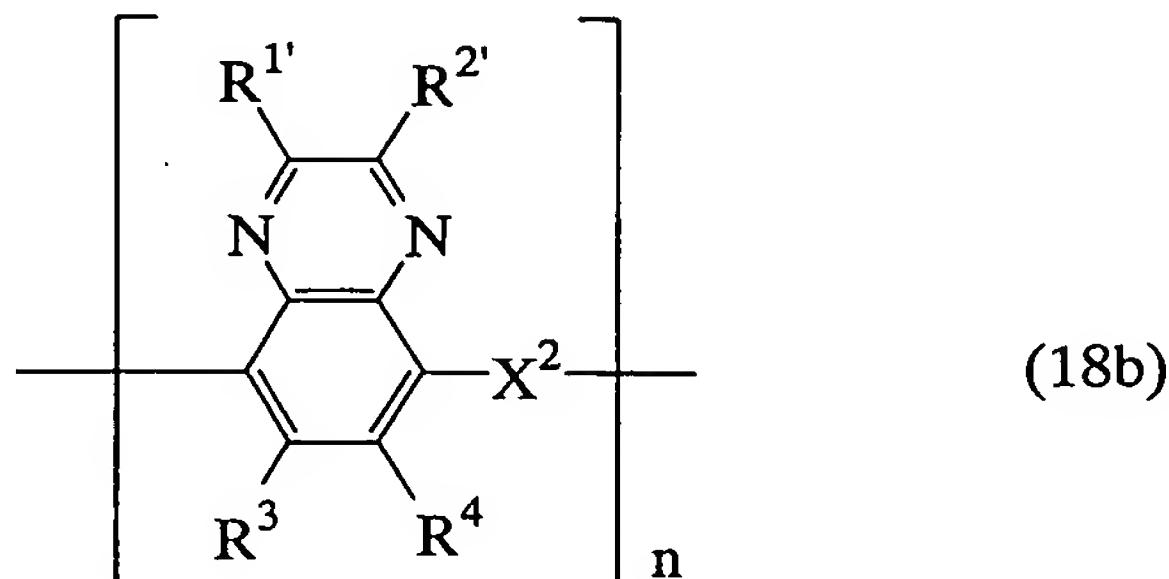
R⁷⁷ and R⁷⁸ independently represent a C₁-C₁₀ alkylene group, a -C(O)CH₂-, -CH₂C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a divalent furan ring which may be substituted with Y or a condensed hetero ring which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and n is an integer of 2 or over.

22. A polyaminoquinoxaline compound having recurring units of the following formula (18b) obtained by polymerizing the monomer defined in claim 15,

[Chemical Formula 22]



5

wherein R¹' and R²' join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , 10 -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , 15 -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thiienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z;

R³ and R⁴ independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be

substituted with Y, a biphenyl group which may be substituted
with Y, a naphthyl group which may be substituted with Y, a
thienyl group which may be substituted with Y, a pyrolyl group
which may be substituted with Y, a furyl group which may be
5 substituted with Y or a condensed heteroaryl group which may
be substituted with Y provided that when R³ and R⁴ are,
respectively, the above-defined phenyl, pyridyl, biphenyl,
naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl
group, these groups may be joined through a single bond;

10 X² represents -NH-R⁷⁷-NH- or -NH-R⁷⁸-;

R⁷⁷ and R⁷⁸ independently represent a C₁-C₁₀ alkylene
group, -C(O)CH₂-, -CH₂C(O)-, a divalent benzene ring which
may be substituted with Y, a divalent pyridine ring which may
be substituted with Y, a divalent biphenyl group which may be
15 substituted with Y, a divalent naphthalene ring which may be
substituted with Y, a divalent thiophene ring which may be
substituted with Y, a divalent pyrrole ring which may be
substituted with Y, a divalent furan ring which may be
substituted with Y, or a condensed hetero ring which may be
20 substituted with Y;

Y represents a halogen atom, a cyano group, a nitro
group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀
alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a
C₁-C₁₀ cyanoalkyl group, a phenyl group which may be
25 substituted with Z, a pyridyl group which may be substituted
with Z, a biphenyl group which may be substituted with Z, a
naphthyl group which may be substituted with Z, a thienyl
group which may be substituted with Z, a pyrolyl group which
may be substituted with Z, a furyl group which may be
30 substituted with Z or a condensed heteroaryl group which may
be substituted with Z provided that if Y is two or more in
number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro
group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀
35 alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a
C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a
naphthyl group, a thienyl group, a pyrolyl group, a furyl

group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different; and

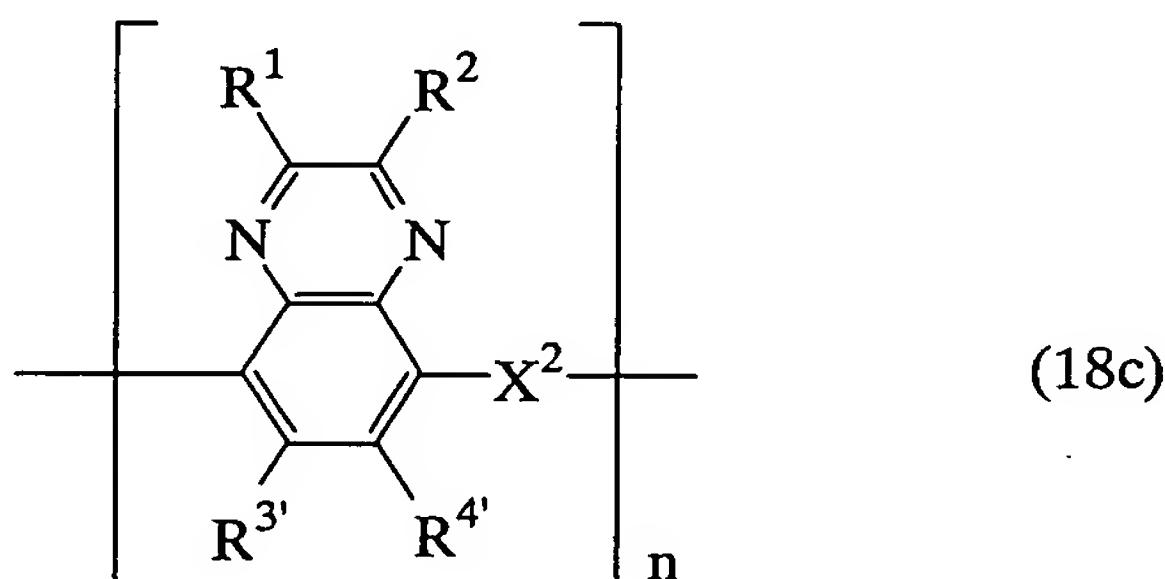
n is an integer of 2 or over.

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23. A polyaminoquinoxaline compound having recurring units of the following formula (18c) obtained by polymerizing the monomer defined in claim 16,

[Chemical Formula 23]

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15

20

wherein R¹ and R² independently represent a hydrogen atom, a hydroxyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R¹ and R² are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R^{3'} and R^{4'} join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- ,
25 -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- ,
-CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- ,
-CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- ,
-OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- ,
-CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- ,
30 -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- ,

-N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-,
-CH=CHCH=CH-, -OCH₂CH=CH-, -CH=CHCH₂O-, -N=CHCH=CH-,
-CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a
hydrogen atom bonded to a carbon atom of these groups may be
5 substituted with Y, and R' represents a hydrogen atom, a
C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀
cyanoalkyl group, a phenyl group which may be substituted
with Z, a pyridyl group which may be substituted with Z, a
biphenyl group which may be substituted with Z, a naphthyl
10 group which may be substituted with Z, a thienyl group which
may be substituted with Z, a pyrolyl group which may be
substituted with Z, a furyl group which may be substituted
with Z, or a condensed heteroaryl group which may be
substituted with Z;

15 X² represents -NH-R⁷⁷-NH- or -NH-R⁷⁸-;

R⁷⁷ and R⁷⁸ independently represent a C₁-C₁₀ alkylene
group, -C(O)CH₂-, -CH₂C(O)-, a divalent benzene ring which
may be substituted with Y, a divalent pyridine ring which may
be substituted with Y, a divalent biphenyl group which may be
20 substituted with Y, a divalent naphthalene ring which may be
substituted with Y, a divalent thiophene ring which may be
substituted with Y, a divalent pyrrole ring which may be
substituted with Y, a divalent furan ring which may be
substituted with Y, or a condensed hetero ring which may be
25 substituted with Y;

Y represents a halogen atom, a cyano group, a nitro
group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀
alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a
C₁-C₁₀ cyanoalkyl group, a phenyl group which may be
30 substituted with Z, a pyridyl group which may be substituted
with Z, a biphenyl group which may be substituted with Z, a
naphthyl group which may be substituted with Z, a thienyl
group which may be substituted with Z, a pyrolyl group which
may be substituted with Z, a furyl group which may be
35 substituted with Z or a condensed heteroaryl group which may
be substituted with Z provided that if Y is two or more in
number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different; and

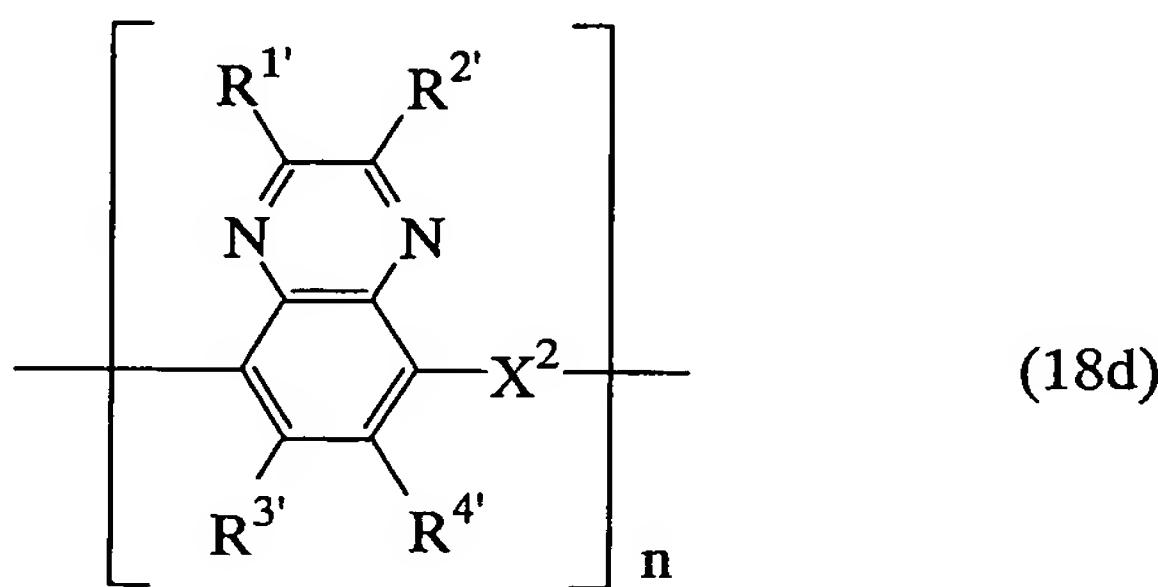
n is an integer of 2 or over.

10

24. A polyaminoquinoxaline compound having recurring units of the following formula (18d) obtained by polymerizing the monomer defined in claim 17,

[Chemical Formula 24].

15



20

wherein R¹' and R²' join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , -OCH₂CH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted 25 with Z, a pyridyl group which may be substituted with Z, a

30

biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z, and R³ and R⁴ join together to form -CH₂CH₂CH₂- , -CH₂CH₂O- , -OCH₂CH₂- , -CH₂OCH₂- , -OCH₂O- , -CH₂CH₂S- , -SCH₂CH₂- , -CH₂SCH₂- , -CH₂CH₂N(R')- , -N(R')CH₂CH₂- , -CH₂N(R')CH₂- , -CH₂CH₂CH₂CH₂- , -CH₂CH₂CH₂O- , -OCH₂CH₂CH₂- , -CH₂CH₂OCH₂- , -CH₂OCH₂CH₂- , -CH₂OCH₂O- , -SCH₂CH₂S- , -OCH₂CH₂S- , -SCH₂CH₂O- , -CH₂CH=CH- , -CH=CHCH₂- , -OCH=CH- , -CH=CHO- , -SCH=CH- , -CH=CHS- , -N(R')CH=CH- , -CH=CHN(R')- , -OCH=N- , -N=CHO- , -SCH=N- , -N=CHS- , -N(R')CH=N- , -N=CHN(R')- , -N(R')N=CH- , -CH=N(R')N- , -CH=CHCH=CH- , -OCH₂CH=CH- , -CH=CHCH₂O- , -N=CHCH=CH- , -CH=CHCH=N- , -N=CHCH=N- , -N=CHN=CH- , or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z;

X² represents -NH-R⁷⁷-NH- or -NH-R⁷⁸-;

R⁷⁷ and R⁷⁸ independently represent a C₁-C₁₀ alkylene group, -C(O)CH₂- , -CH₂C(O)- , a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a divalent furan ring which may be substituted with Y or a condensed hetero ring which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group which may be
5 substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be
10 substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C₁-C₁₀ alkyl group, a C₁-C₁₀ haloalkyl group, a C₁-C₁₀ alkoxy group, a C₁-C₁₀ cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different;
20 and

n is an integer of 2 or over.

25. A film obtained by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of
25 claims 1 to 24.

26. The film according to claim 25, wherein the film is prepared by spin coating, casting or vacuum deposition.

30 27. The film according to claim 25, wherein the film is obtained by compression molding.

28. An electro chromic device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound
35 as defined in any one of claims 1 to 24.

29. A semiconductor device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

5 30. A p-type semiconductor obtained by oxidizing, with an oxidizing agent or through electrochemical doping, an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

10 31. An n-type semiconductor obtained by reducing, with a reducing agent or through electrochemical doping, an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

15 32. A solar cell made by use of the p-type semiconductor defined in claim 30 and the n-type semiconductor defined in claim 31.

20 33. An organic electroluminescent device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

25 34. A non-linear organic material made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.